

WHAT IS CLAIMED IS:

1. A method for administering a constructed response assessment item to a respondent:

defining a stimulus response stem requiring the respondent to demonstrate knowledge of a relationship between two or more concepts;

providing the respondent at least one device uniquely associated with each of the two or more concepts, at least one device having at least one attribute that can be selectively manipulated by the respondent to change a relationship of that device with respect to at least one other device to construct an arrangement of devices representing a relationship between the concepts with which the devices in the arrangement are associated;

defining a scoring rubric for the constructed response assessment item including a conceptual pattern corresponding to a relationship between the two or more concepts;

observing the selectively manipulable attributes of the devices in the arrangement constructed by the respondent;

converting the observed attributes into a conceptual pattern associated with the arrangement constructed by the respondent; and

comparing the conceptual pattern of the arrangement constructed by the respondent with the conceptual pattern of the scoring rubric to determine whether or not the conceptual pattern associated with the arrangement

constructed by the respondent matches the conceptual pattern of the scoring rubric.

2. The method of claim 1, wherein said rubric includes a conceptual pattern corresponding to a correct relationship between the two or more concepts.

3. The method of claim 1, wherein the devices comprise physical items that the respondent can physically manipulate and/or position with respect to each other to create a spatial arrangement of the devices demonstrating a relationship between the concepts with which the devices are associated.

4. The method of claim 1, wherein the devices comprise virtual items displayed on a computer that the respondent can electronically manipulate and/or position with respect to each other to create a virtual arrangement of the devices demonstrating a relationship between the concepts with which the devices are associated.

5. The method of claim 1, wherein the attribute of each device that can be manipulated includes one or more of size, length, height, spatial, orientation, color, direction of movement, speed of movement, sound, sound

volume, texture, pattern, smell, taste, elasticity, weight, transparency, absorbency, reflectivity, shape, electrical charge, magnetism, temperature, conductivity, composition, intensity, perspective, emotion, and time.

6. The method of claim 1, further comprising defining at least one implication corresponding to each pattern of the rubric, wherein each implication comprises information relating to an outcome that occurs as the result of a pattern being found in the student response to an item.

7. A method of creating a constructed response assessment item:  
defining a stimulus response stem requiring a respondent to demonstrate knowledge of a relationship between two or more concepts;  
defining at least one device uniquely associated with each of the two or more concepts, at least one device having at least one attribute that can be selectively manipulated by the respondent to change a relationship of that device with respect to at least one other device to construct an arrangement of devices representing a relationship between the concepts with which the devices in the arrangement are associated; and  
defining a scoring rubric for the constructed response including a conceptual pattern corresponding to a relationship between the two or more.

8. The method of claim 7, wherein said rubric includes a conceptual pattern corresponding to a correct relationship between the two or more concepts.

9. The method of claim 7, wherein the devices comprise physical items that the respondent can physically manipulate and/or position with respect to each other to create a spatial arrangement of the devices demonstrating a relationship between the concepts with which the devices are associated.

10. The method of claim 7, wherein the devices comprise virtual items displayed on a computer that the respondent can electronically manipulate and/or position with respect to each other to create a virtual arrangement of the devices demonstrating a relationship between the concepts with which the devices are associated.

11. The method of claim 7, wherein the attribute of each device that can be manipulated includes one or more of size, length, height, spatial, orientation, color, direction of movement, speed of movement, sound, sound volume, texture, pattern, smell, taste, elasticity, weight, transparency, absorbency, reflectivity, shape, electrical charge, magnetism, temperature, conductivity, composition, intensity, perspective, emotion, and time.

12. The method of claim 7, further comprising defining at least one implication corresponding to each pattern of the rubric, wherein each implication comprises information relating to an outcome that occurs as the result of a pattern being found in the student response to an item.

13. The method of claim 7, wherein defining at least one device comprises:

selecting a template defining a plurality of devices and attributes of each device that can be manipulated; and

selecting one of said devices to be uniquely associated with each of said two or more concepts.

14. A system for administering a constructed response assessment item to a respondent, said system comprising:

a content creation engine for defining a stimulus response stem requiring the respondent to demonstrate knowledge of a relationship between two or more concepts, said content creation engine comprising:

a concept creator constructed and arranged to allow an item designer to defined the two or more concepts;

a template selector constructed and arranged to enable the item designer to select a template defining devices with which each of the

two or more concepts will be associated and attributes of the devices that can be manipulated by the respondent; and

a representation linker constructed and arranged to enable the item designer to uniquely associate at least one of the devices defined by said template selector with each of the two or more concepts;

an administration engine for administering the constructed response item to the respondent, said administration engine comprising:

a representation engine constructed and arranged to present devices selected to represent the two or more concepts to a respondent;

a manipulation engine constructed and arranged to enable the respondent to manipulate attributes of the devices; and

an attribute acquisition engine constructed and arranged to retrieve and record attributes of the manipulated devices;

a rubric engine for creating a rubric for evaluating a response by the respondent, said rubric engine comprising:

a pattern definer constructed and arranged to enable the item designer to define one or more rubric patterns defining device arrangements that correspond to correct and incorrect responses that are possible with the templates selected using said template selector; and

an implication selector constructed and arranged to enable the designer to associate one or more implications with each of the patterns defined by said pattern definer; and  
a scoring engine for scoring a response created by the respondent, said scoring engine comprising:

a pattern recognition and comparison engine constructed and arranged to convert the attributes of the manipulated devices recorded by said attribute acquisition engine and to convert the attributes to a response pattern and to compare the response pattern to the one or more rubric patterns defined by said pattern definer to identify any match that may exist between the response pattern and the one or more rubric patterns;

an implication selector constructed and arranged to select at least one of the one or more implications associated with any rubric patterns which match the response pattern; and

a results engine constructed and arranged to return desired response results based on the implication selected by the implication selector.

15. A system for creating a constructed response assessment item comprising:

a content creation engine for defining a stimulus response stem requiring the respondent to demonstrate knowledge of a relationship between two or more concepts, said content creation engine comprising:

a concept creator constructed and arranged to allow an item designer to defined the two or more concepts;

a template selector constructed and arranged to enable the item designer to select a template defining devices with which each of the two or more concepts will be associated and attributes of the devices that can be manipulated by the respondent; and

a representation linker constructed and arranged to enable the item designer to uniquely associate at least one of the devices defined by said template selector with each of the two or more concepts; and

a rubric engine for creating a rubric for evaluating a response by the respondent, said rubric engine comprising:

a pattern definer constructed and arranged to enable the item designer to define one or more rubric patterns defining device arrangements that correspond to correct and incorrect responses that are possible with the templates selected using said template selector; and

an implication selector constructed and arranged to enable the designer to associate one or more implications with each of the patterns defined by said pattern definer.



16. A system for administering a constructed response assessment item to a respondent, said system comprising:

content creation means for defining a stimulus response stem requiring the respondent to demonstrate knowledge of a relationship between two or more concepts;

item administration means for administering the constructed response item to the respondent;

rubric means for creating a rubric for evaluating a response by the respondent; and

scoring means for scoring a response created by the respondent.

17. A system for administering a constructed response assessment item requiring a respondent to demonstrate knowledge of a relationship between two or more concepts by manipulating attributes of devices uniquely associated with each of said two or more concepts, said system comprising:

an administration engine for administering the constructed response item to the respondent, said administration engine comprising:

a representation engine constructed and arranged to present devices selected to be uniquely associated with each of the two or more concepts to a respondent;

a manipulation engine constructed and arranged to enable the respondent to manipulate attributes of the devices; and

an attribute acquisition engine constructed and arranged to retrieve and record attributes of the manipulated devices; and a scoring engine for scoring a response created by the respondent, said scoring engine comprising:

a pattern recognition and comparison engine constructed and arranged to convert the attributes of the manipulated devices recorded by said attribute acquisition engine and to convert the attributes to a response pattern and to compare the response pattern to one or more predefined rubric patterns which define device arrangements that correspond to correct and incorrect responses to identify any match that may exist between the response pattern and the one or more rubric patterns.